

FLIGHT

The
AIRCRAFT
ENGINEER
&
AIRSHIPS

First Aero Weekly in the World

Founder and Editor: STANLEY SPOONER

A Journal devoted to the Interests, Practice, and Progress of Aerial Locomotion and Transport

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DIARY OF FORTHCOMING EVENTS

Club Secretaries and others desirous of announcing the dates of important fixtures are invited to send particulars for inclusion in the following list:—

1926

Jan. 7	Prof. A. J. Sutton Pippard. "The Experimental Stress Analysis of Frameworks," before R.Ae.S.
Jan. 9	Aero Club of Belgium 25th Anniversary Banquet.
Jan. 11	F.A.I. Conference, Paris.
Jan. 12	Mr. C. Howarth. "Some Aspects of Full-Scale Experiments," before Inst.Ae.E.
Jan. 13	London Aeroplane Club Inaugural Dance, Suffolk Galleries, Suffolk Street, W. 1.
Jan. 21	Maj. J. S. Buchanan. "The Schneider Cup Race, 1925," before R.Ae.S.
Jan. 26	Lieut. Olechnovitch. "The Care and Maintenance of Tools as an Important Factor in Workshop Routine," before Inst.Ae.E.
Feb. 4	Joint Meeting of R.Ae.S. and Inst.Ae.E. at R. Soc. of Arts. Mr. C. L. Lawrance, "American Aircraft Engine Development."
Feb. 9	Informal Meeting, Inst.Ae.E.

EDITORIAL COMMENT.

AS might have been anticipated, the first published annual figures of Imperial Airways, Ltd., a *résumé* of the proceedings of whose first ordinary general meeting was published in last week's issue of FLIGHT, showed a loss. Nobody who had been watching the air traffic at Croydon during the last year or so would have expected otherwise. In view of the sums involved, the actual loss is not, of course, a particularly serious one. The explanation given for the deficit is that the first year of the company's existence is regarded as mainly an experimental period, and that the work of centralising the control, from the four separate companies working when Imperial Airways Ltd. came into being, into a single organisation, was a considerable handicap. While there is, of course, no denying that this reorganisation must for a time have resulted in some dislocation and loss of time, it will not, we think, be generally agreed that the company's activities have since been such as to give any great hope for an immediate improvement. The period may be regarded by the directors as experimental, but on the other hand, the company started with the advantage of the accumulated experience of the four operational companies that had been working for a considerable period, so that there was not, or should not have been, very many problems of a new character to solve. Each of the four companies had very extensive knowledge of the particular route operated by it, and the exact capabilities of all the machines were well known. It is thus somewhat difficult to appreciate what there can have been, of a very experimental character, to discover.

Reference is also made in the report to a delay that occurred during the early part of the company's financial year, owing to "regrettable and serious labour troubles." Presumably, what is meant here is the dispute with the pilots, who rightly insisted upon a rate of pay commensurate with the nature of the work they had to do. If it had not been for the fact that the company seemed to regard the air line pilots as little more than taxi-drivers, this delay

would not have occurred, and so in the end the company itself is to a great extent responsible for "the very adverse effect on operations" which this dispute is claimed to have had.

In the matter of machines, it is an open secret that the company let its fleet dwindle until only a very few machines were in operation, and although the report does not appear to make any reference to this state of affairs, it is fairly obvious that the question of the amount of flying done must have had a serious effect upon returns.

Personally, we are of the opinion that failure to attract the right kind of traffic in sufficient volume is likely to have been responsible to a very much larger extent than any shortcomings in the machines as regards being "commercially economical" types. Nor are we at all convinced that under the new subsidy basis, whereby not machine-miles flown but horse-power miles are to be the standard by which the operations are judged, is likely to lead to any great improvement. It may be granted that the new large and powerful machines which are coming along will be more economical in that they will carry, on any one flight, a larger number of passengers, and that, therefore, such costs as pilots' salaries, &c., which are independent of the number of passengers or weight of load carried, will not increase in proportion. On the other hand, as Major C. C. Turner pointed out at the last monthly Royal Aero Club dinner, it would seem that the new basis will be likely to result in considerably fewer flights being made, and this would certainly tend to discourage rather than encourage air travellers. Take the London-Paris route. If a business man is assured that if he goes to Croydon almost any time of the day, he will not have to wait very long before there is a machine leaving, he is much more likely to use the air service than if there is but one machine per day, which may leave at a time that does not suit his particular arrangements. And as we have previously pointed out, in our view, improvement is to be found rather in attracting greater traffic than in any possible vast improvements in the machines. While, therefore, we do agree that, as regards safety and reliability, the new large machines will, in all probability, represent a considerable improvement, we are not nearly so certain that they will, unless a very large number of them is used *and filled*, be economically better. It seems to stand to reason that it is cheaper to run a small machine with full load than a large machine with half or quarter load.

Another line of improvement would seem to be the use of particular types of machines for particular purposes.

Air Control

One is curiously reminded of the old doggerel "Little satisfaction some men find in life, Some want quick divorces, others want a wife," by two newspaper paragraphs published on the same day, December 12. In one reference is made to the coming fight for a single air service, which certain parties in the United States desire, claiming that separate air services for army and navy lead to overlapping and waste. The other foreshadows a revival in Great Britain of the fight for a separate air arm for each of the services. Thus we have the somewhat curious spectacle of one nation with divided air services wanting a single air service, and another which, having at great trouble secured a single service, wants to split it up again.

FLIGHT's attitude is too well known to need reiteration here. We initiated, and have always stood for, the slogan "One service, one uniform, one badge," and we have so far seen nothing in this or any other country to give us cause to change our opinion. That the fight will be revived in this country, particularly over the airship question, we have not the slightest doubt, nor are we at all sure that there would be much harm in handing airships over to the Navy, although by its earlier attitude towards "gas bags" the Navy has done little to deserve being put in charge, but the design, construction and operation of airships are so much more parallel with maritime problems, than heavier-than-air craft, that a very good case could be made out. As regards the Royal Air Force, however, we entirely disagree with the validity of the Navy's claims, nor have we any fear that the Admiralty will succeed in the fight, the revival of which is foreshadowed.

Airship Clubs

As briefly recorded elsewhere in this issue, Commander F. L. M. Boothby is reviving the idea of forming a club for the encouragement of airship flying. It is quite a long time since Commander Boothby first suggested this scheme, and at the time we welcomed it in FLIGHT as an aid to revive the interest in airships and as a means of, if not training airship pilots, at any rate of giving flying practice to the few who still remain.

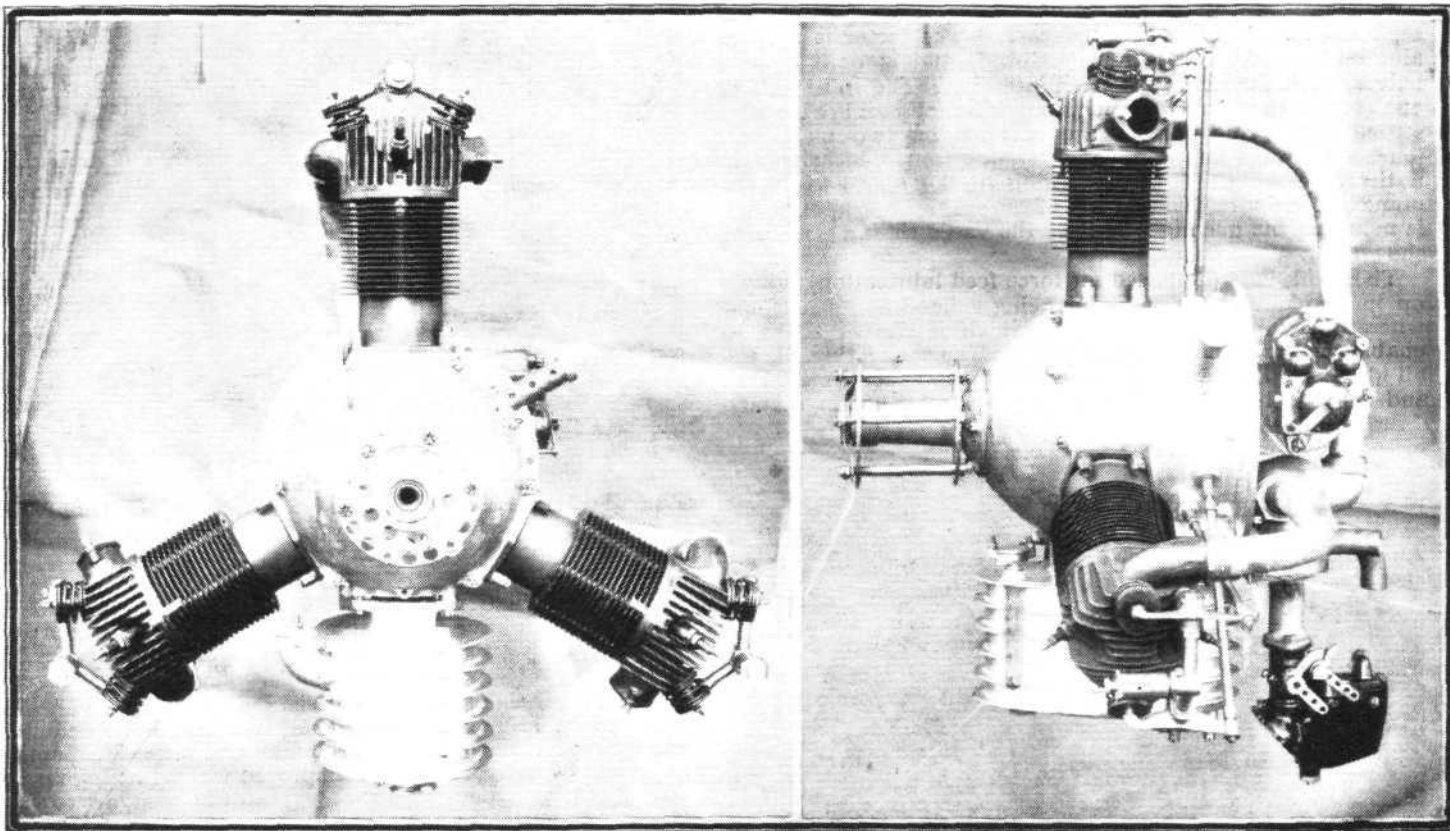
Under the new scheme, which we understand Commander Boothby has placed before the Air Ministry, it is suggested that, as but five out of the six light aeroplane clubs originally contemplated have come into being, the Air Ministry has the subsidy intended for one club, *i.e.*, about £3,000, going begging, and that this might be devoted to assist in the formation and operation of an airship club. The idea is quite a reasonable one. We seem to be determined to go on with airships sometime, and that being so we shall want pilots and we shall want crews, and we shall want experience. Such a club as that suggested should do much towards developing the "lighter-than-air" sense (in more ways than one), and thus should be deserving of support. Commander Boothby is reported to have got an option, at £1,500, on the small airship prepared for the Algarsson expedition, so that out of the Air Ministry's £3,000 there should still be a reasonable amount left towards initial expenses in formation of club and preparation of hangar accommodation, which it is hoped to obtain either at Bedford or at Pulham. The scheme does not appear to be at all an unreasonable one, and the Air Ministry might do worse than fall in with Commander Boothby's suggestion. It is likely, however, that this year the existing light 'plane clubs will want a good deal of support, and the Air Ministry may possibly desire to reserve any surplus for assistance in this direction. Frankly we have not overmuch hope of the suggestion being adopted. But as the Navy is now evincing a certain interest in airships, why not let the Senior Service come forward and help the scheme through its initial stages? If airships are ultimately to be handed over to the Navy, this step would seem to be a logical one. The airship members would be "yachtsmen of the air." What more natural than that the Navy should help them a little. And the Navy has much more money to play with than has the Air Ministry.

THE BLACKBURNE "THRUSH" LIGHT 'PLANE ENGINE

A 3-Cylinder Radial of 1,500 c.c. Capacity

LAST week we published two views of the new 1,500 c.c. Blackburne light 'plane engine produced by Burney and Blackburne, Ltd., of Bookham, Surrey, and which has recently passed the Air Ministry's 100 hours' type tests.

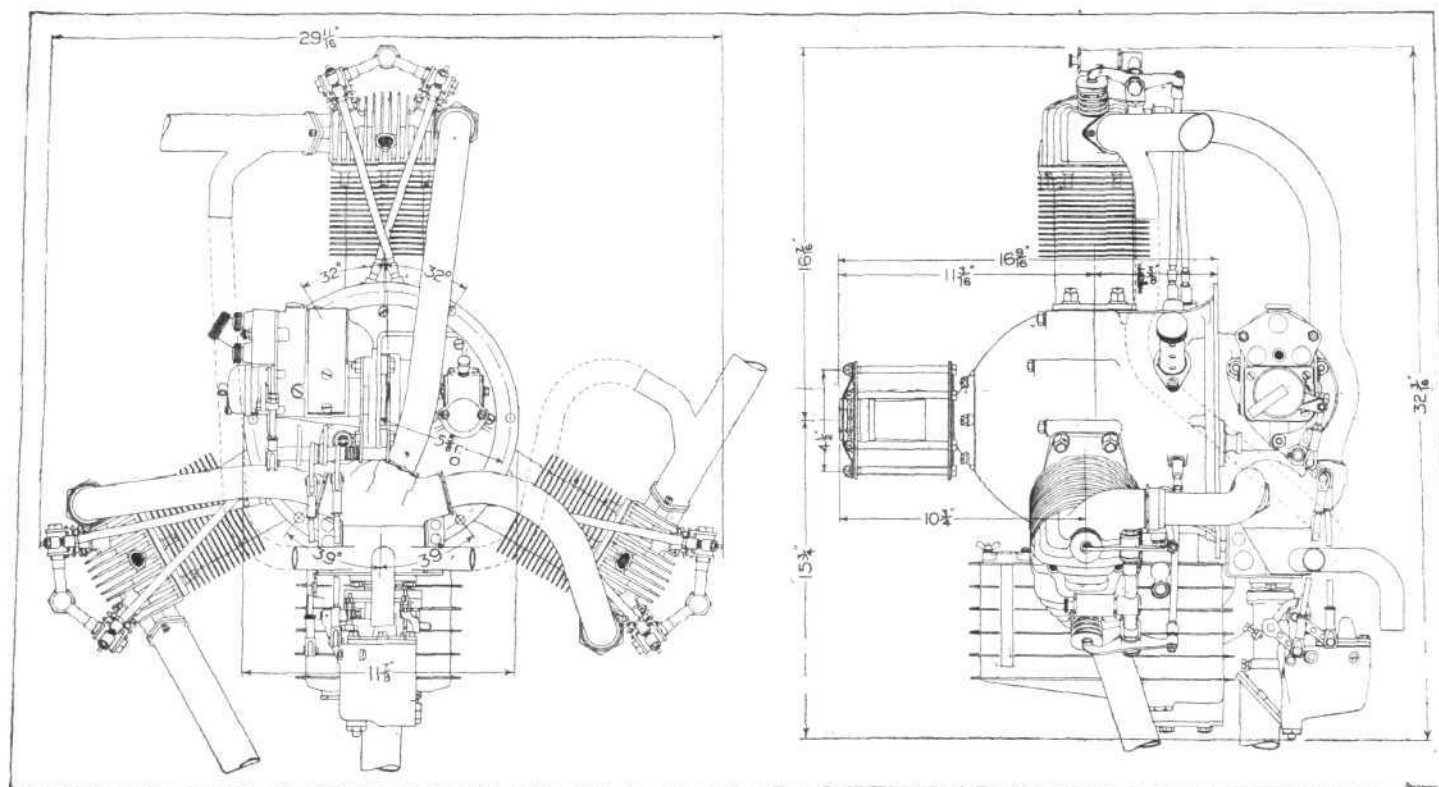
which have enabled the reliability of the engine to be increased to such an extent that it has been, as stated, able to pass what is undoubtedly a very severe test. The Blackburne "Thrush" may now be regarded as a very suitable engine



THE BLACKBURNE "THRUSH" LIGHT 'PLANE ENGINE: Front and side views. Note the ribbed oil sump below the crankcase.

Generally speaking, the "Thrush," as the engine is called, is similar to the 1924 model, but the capacity has been increased to 1,500 c.c., and improvements have been effected

for light 'planes, and its weight is well within the limits set by official regulations, being only 132 lb. including sump, as against the 170 lb. permitted. For this year's light 'plane

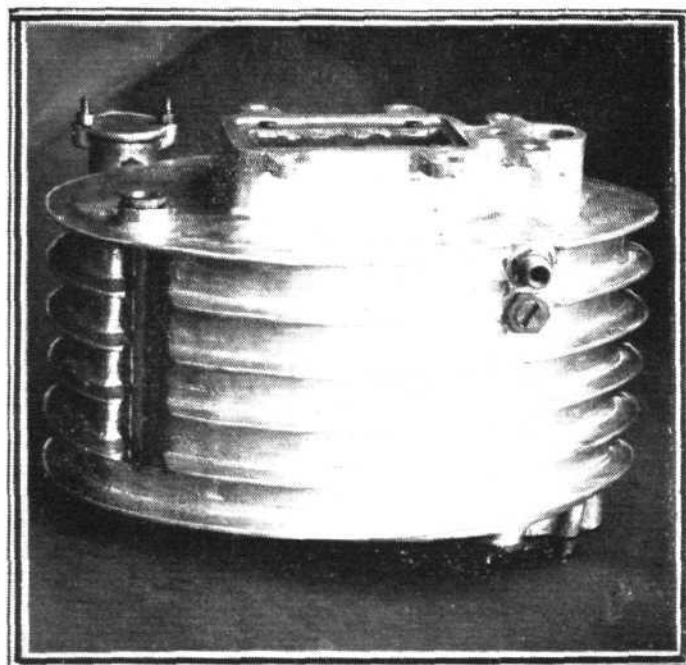


THE BLACKBURNE "THRUSH" LIGHT 'PLANE ENGINE: Installation diagram with main dimensions shown.

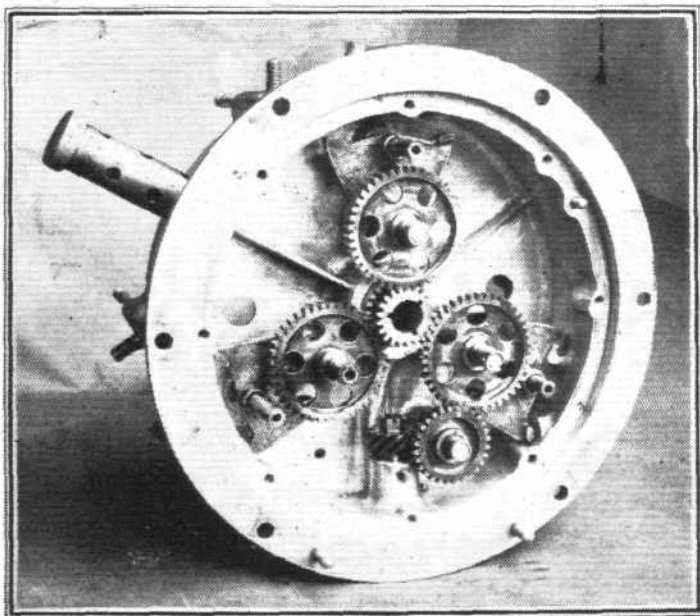
competitions the "Thrush" should particularly appeal on account of its low fuel consumption which averages 0.54 to 0.52 pints per horse-power per hour. In the competition the load carried per unit of fuel consumed for the total distance of 2,000 miles is the fundamental basis for the award of marks, and for an engine of less than 40 h.p. the fuel consumption of the "Thrush" can be regarded as very good.

The Blackburne "Thrush" is, as will be seen from the accompanying illustrations, a three-cylinder radial air-cooled, with overhead valves and a large oil sump built on as a separate unit below the crankcase. The latter is a large aluminium casting, generously ribbed, and is built in two halves, with the division placed laterally. The front half of the crankcase is dome shaped, and internally ribbed to give stiffness. In this portion are carried the two main ball journal bearings for the crankshaft, the front one being also a thrust bearing. A plain bearing in the rear half of the crankcase supports the rear end of the crankshaft, upon which is mounted the driving wheel for the valve timing gear, etc., shown in a photograph.

The crankshaft (hollowed for force feed lubrication) is built up in two halves, the crankpin being splined at its rear end where it fits into the rear web, which is slotted so as to enable the pin to be locked in place. The connecting rods are all identical, that is to say, there is no master connecting rod, and sit side by side on the crankpin, roller bearings being



The oil sump of the Blackburne "Thrush" is a separate unit, bolted to the bottom of the crankcase.



A view inside the timing gear-case of the Blackburne "Thrush," showing the valve gear for the three cylinders, the rockers, and the oil-pump drive.

employed for the big ends. The pistons are of aluminium, and are of normal type.

The timing gear is in the form of a plain spur gear, housed in the back of the rear half of the crankcase, the driving wheel on the crankshaft having the three camshafts and their gears symmetrically disposed around it as shown in a photograph. Here also is seen the helical gear for the oil pump, and the magneto drive. The rear bearings for the three camshafts, auxiliary drive shafts, etc., are in the back cover of the crankcase.

The overhead valves are operated by tappets from the rockers in the timing gear case, and it will be observed that the tappets cross over so as to be more nearly in line with the valve stems and thus reducing the oblique loads on the overhead valve mechanism. The valves are of the tulip type, held on their seating by two concentric coil springs each. These springs are located on the top of the cylinders by the fins of the cylinder heads having shallow grooves to prevent the springs slipping, and at their outer ends the springs are supported on washers, which in turn are held in place on the valve stems by small split collars housed in a recess in the valve stems. The details of this, and the manner of removing valves, are shown in some of our sketches.

A yoke in the shape of a very flat inverted vee braces the upper ends of the pillars supporting the overhead rockers, and also prevents them from twisting. At the same time they serve to convey lubricant from the grease cups to the rocker bearings.

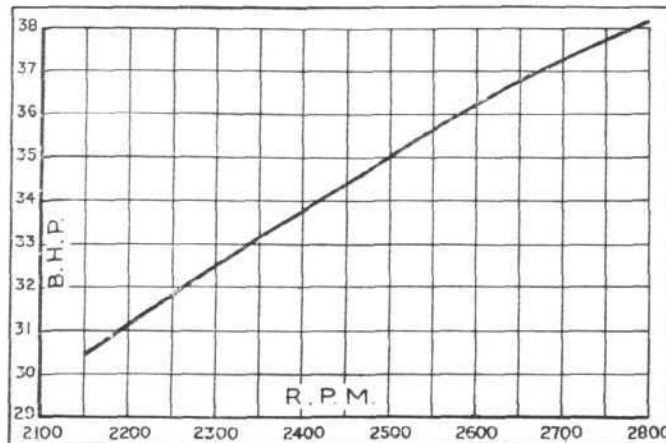
The steel cylinders are secured to the crankcase by four bolts each, and have detachable cast-iron heads with vertical fins running in a fore and aft direction. Six bolts secure the head to the cylinder, a plain copper washer being inserted to make a gas-tight joint. The six bolt by means of which the detachable cylinder heads are attached to the cylinders are dropped through holes in the fins, and a special spanner, forked to slip over the fins, is employed for tightening up the special bolts. The cylinder heads, it will be seen, are of very symmetrical form and should give a combustion chamber of very good shape. The two sparking plugs are placed opposite one another, and both are fired by the same magneto.

The B.T.H. magneto is mounted on a shelf on the back of the cover, and it is to be noted that an impulse starter is provided, so that there should be little difficulty in starting the engine. The carburettor is a Claudel-Hobson, type M.B.P., which is provided with a special patented atomiser, which, no doubt, accounts to a not inconsiderable extent for the very low fuel consumption. It might also be mentioned that the plugs used in the recent Air Ministry type tests were K.L.G. 12-mm. plugs, No. 214.

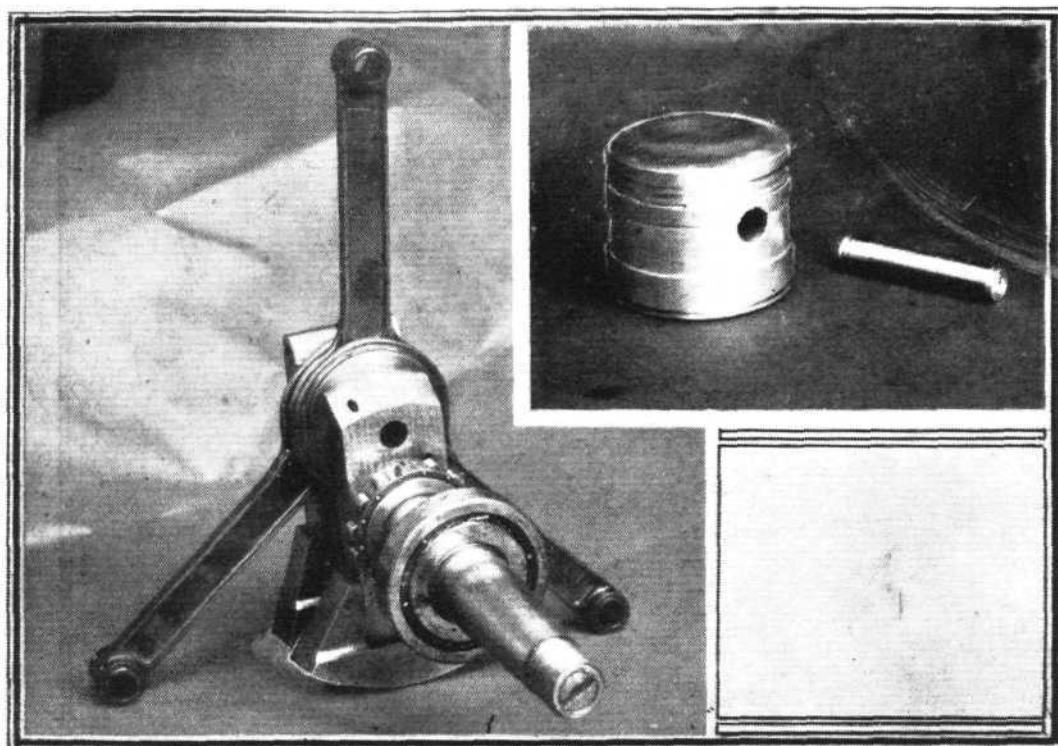
The "Thrush" is mounted in the aeroplane by six bolts through the flange at the back, the pitch circle for the holes, and their spacing, which is uneven, being shown in the rear view of the installation diagram.

Bolted to the bottom of the crankcase is a large oil sump, with ribs cast externally to improve the cooling. The oil pump draws oil from this sump, through a filter, and delivers it to the bearings, afterwards returning it to the sump through another filter. The sump has a capacity of 7 pints, which should be sufficient for quite long periods of running.

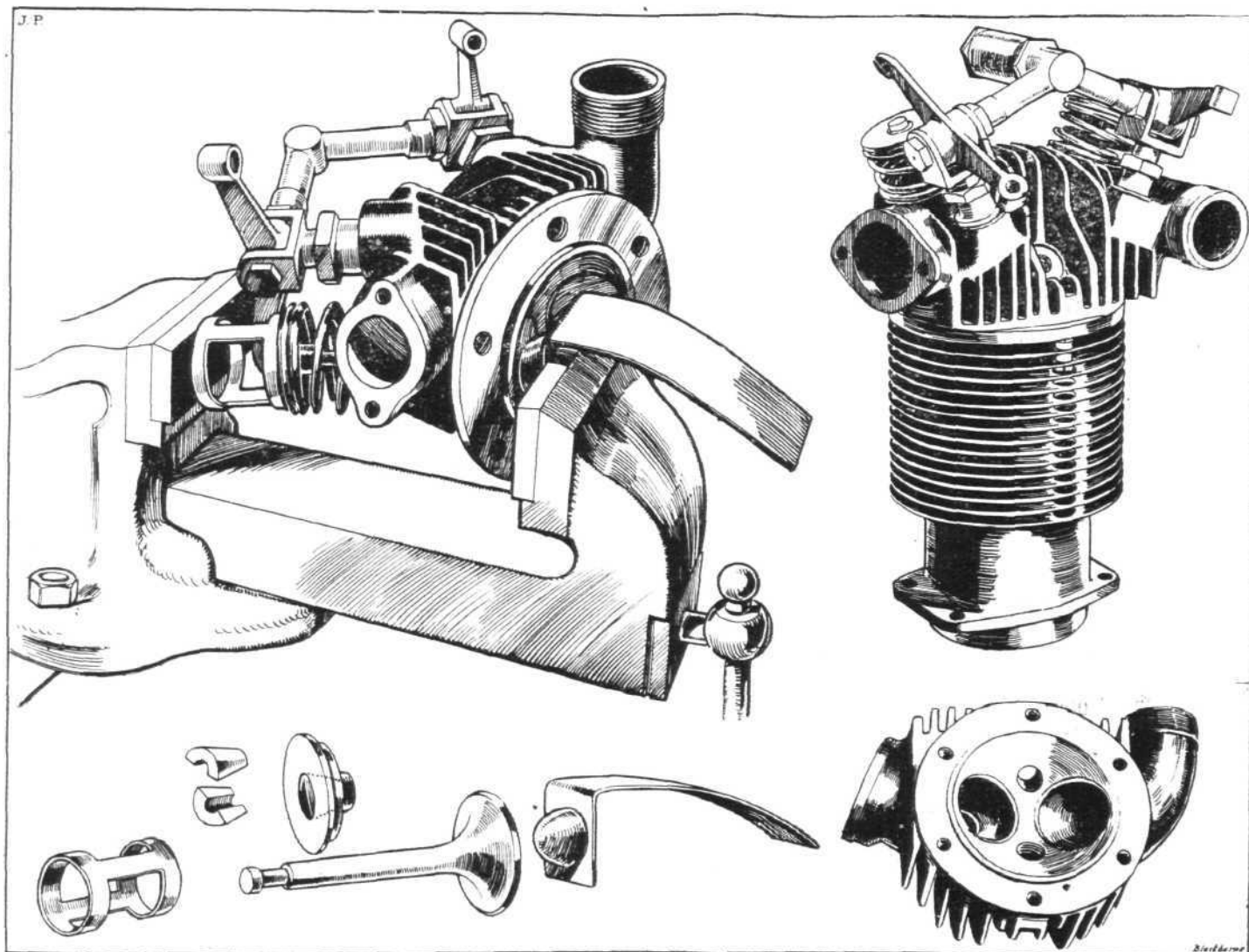
Most of the important overall dimensions of the Blackburne



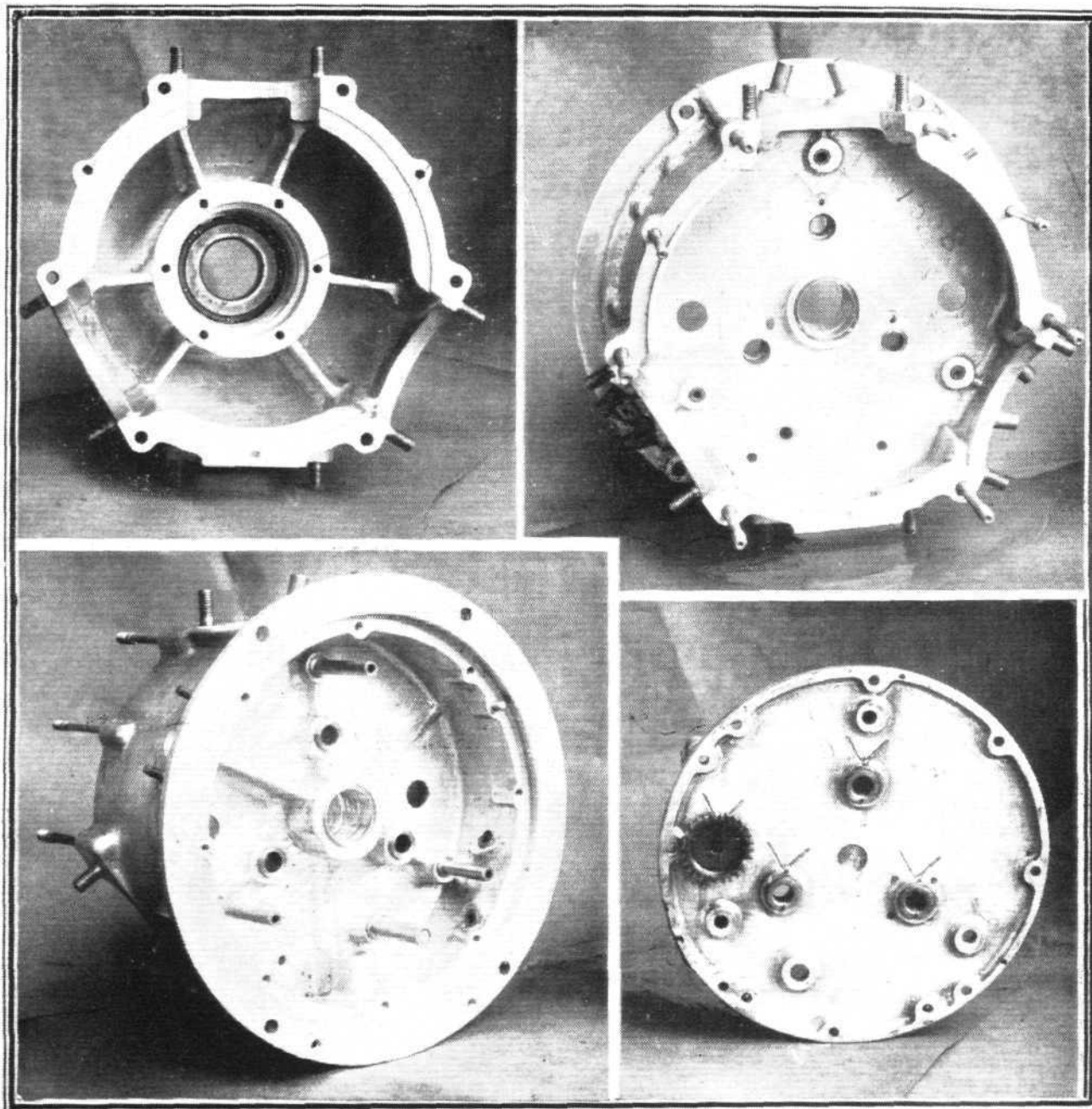
Power curve of the Blackburne "Thrush."



The Blackburne "Thrush": The crankshaft and connecting-rod assembly, and (inset) a piston and gudgeon-pin.



SOME DETAILS OF THE BLACKBURNE "THRUSH" LIGHT PLANE ENGINE: On the right, a cylinder, showing the overhead valve gear. Below, a view of the valve seats inside the detachable cylinder head. On the left is shown a cylinder head placed in the vice for removal of the valves. The valve itself, the means employed for securing it, and the special tools used for removing the valve from the cylinder are shown below.



THE BLACKBURNE "THRUSH": The two upper photographs show—On the left, a view inside the ribbed front half of the crankcase. Right, a front view of the rear half of the crankcase. Below, on the left, the same is shown from the timing-gear side; and on the right, the back cover of the engine.

"Thrush" are shown on the accompanying installation diagram. It may be mentioned, however, that the bore is 81 mm. and the stroke 96.8 mm., giving a capacity of 1,494 c.c. The normal speed of the engine is 2,500 r.p.m., which is low enough to allow of direct drive, and yet obtain reasonably good propeller efficiency. At this speed, the engine develops 35 b.h.p. The maximum permissible speed is 2,750 r.p.m., when the power is 38 b.h.p. The weight of the engine, including oil sump, exhaust pipes, induction and ignition system, impulse starter, propeller hub, &c., is 132 lb., corresponding

to a specific weight of 3.77 lb./h.p., based on normal power. This figure includes oil sump, exhaust pipes, induction manifold, carburettor, magneto, impulse starter, propeller hub, etc.

Thus, the engine is not exactly a light weight, but its robust and simple construction, coupled with the low fuel consumption should easily outweigh any slight disadvantage due to the weight. The engine is easy to dismantle and overhaul, and its maintenance should present no difficulty to anyone at all used to internal-combustion engines.



The R.E.P. "Joystick" Claim

THE French Court of Cassation has given judgment in favour of the claim for 3,000,000 fr. by M. Esnault Peltrie in connection with his invention of the "Joystick" aeroplane control. This will probably result in further claims and actions, not only in France but in other countries, and some will wonder why it is called a "joy" stick.

American Aeronautical Safety Code Published

THE American Aeronautical Safety Code, one of a series of safety codes formulated under the rules of procedure of the American Engineering Standards committee, is now issued. In drafting the code the intention was not to prescribe too closely the acceptable methods of design, construction or operation, but to formulate criteria of good practice that

would promote a general agreement and understanding as to acceptable safety standards. The code includes the following parts:—Introductory Part; Part I, Aeroplane Structure, Design, Fabrication and Tests; Part II, Power Plants, Design, Assembly and Tests; Part III, Equipment, Maintenance and Operation of Aeroplanes; Part IV, Signals and Signalling Equipment; Part V, Aerodromes and Airways; Part VI, Traffic and Pilotage Rules; Part VII, Qualifications for Airmen; Part VIII, Balloons (Free and Captive); Part IX, Airships; Part X, Parachutes. It is published and distributed by the Society of Automotive Engineers, Inc., 29, West 39th Street, New York City. The price for single copies or small quantities is \$1.50 each; for larger quantities a reduced price will be quoted. Orders should be addressed to the Society of Automotive Engineers.

THE REORGANISATION OF THE ITALIAN AIR MINISTRY

THE steady growth during the past few years of Italian aeronautics has been very marked to all who have studied the progress of aviation in general, so the following notes, from a contributor who is thoroughly conversant in the matter, on the organisation of Italian aeronautics will, we think, be of interest to many.

One of the most important points of the re-formation of the Italian Ministry in October, 1922, was the reorganisation of aeronautics as an independent organ separate from the Army and Navy.

From the time of the armistice to the year 1922, aeronautics were practically abandoned, for reasons of economy and because the firms had stopped all experimental work, owing to lack of orders. There were also political difficulties, as workers refused to co-operate in the building of engines for aircraft, as they considered these organs of war.

At the end of January, 1922, the Air Commission was instituted, headed by His Excellency Mussolini himself, and with the Hon. Finzi as Vice-Commissioner, assisted by His Excellency Mercanti, Chief of the General Direction for Aeronautics, and Colonel Moizo, Military Commander of the Air Force. By June 30, 1924, the Italian Air Ministry had already 66 squadrons in service, while the aircraft constructing firms had presented more than 18 new experimental machines and 4 new types of engine.

The retirement in June, 1924, of Hon. Finzi and His Excellency Mercanti, brought about a considerable change in the Air Authorities and a busy period of reorganisation which ended in June, 1925.

At that time the President of the Ministry, Mussolini,



General P. R. Piccio, Chief of Air Staff in Italy.

that unique Ministry of National Defence which has already been proposed in our own and other countries as the most logical solution of the military problem.

The co-ordination of the three Ministries is, therefore, due to the fact that President Mussolini is at the same time Secretary for the three Ministries (Army, Navy and Air).

A second innovation, which is perhaps more important, is the appointment of a Chief of General Staff which co-ordinates the three Offices of the Army, Navy and Aeronautics, so that in case of war the work of the three Offices of the Staff would not be separate and independent from each other as hitherto.

So as to give an exact idea of the dependency and relationship of the various heads and officers of military administration, we would refer the reader to Figs. 1 and 2. Fig. 1 shows the divisions of the Italian National Defence; Fig. 2 refers to the Air Ministry only.

Italy has been the first definitely to carry out the unification of military activities, and it is hoped that this unification will permit considerable economy. For the present, the service of the buildings, the medical service and the chemical service have been united.

The reconstruction of the Air Ministry can, therefore, be divided in three periods: The first started in January, 1923, and ended October 31, 1923, with the result of a first group of squadrons (25) with newly-built machines but of old types, dealing at the same time with the Army and Navy so as to establish the independency of the Air Service.

In the second period, which ended on October 31, 1924, the number of squadrons was increased to 66, and tests of

The Prime Minister, Sig. Mussolini.

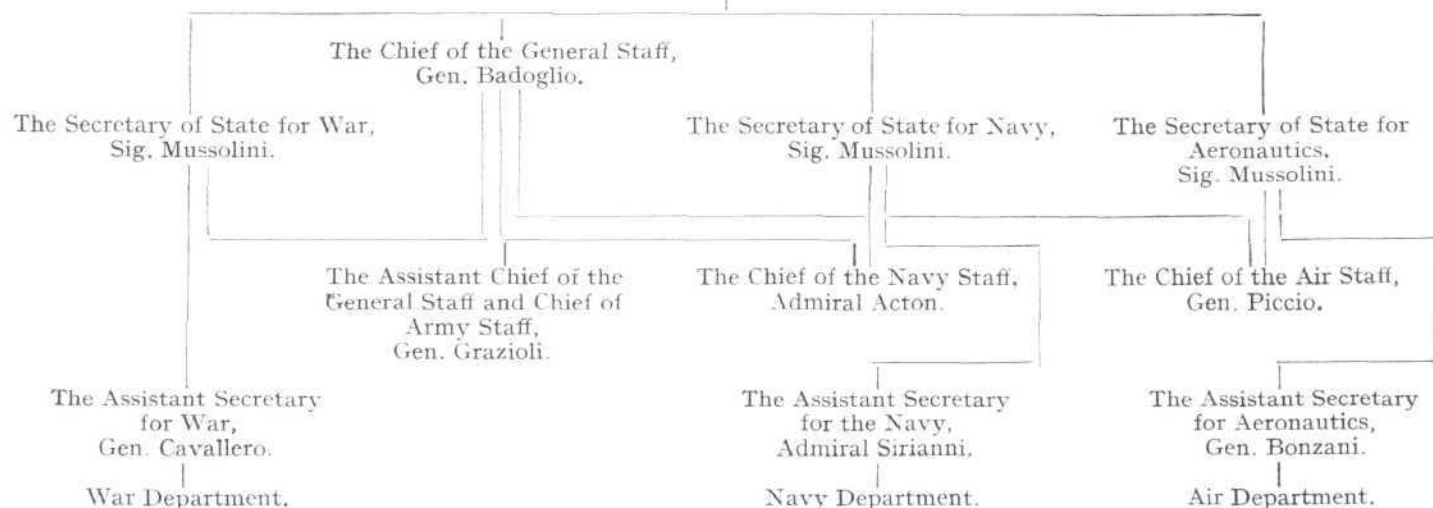


Fig. 1.

definitely instituted the Air Ministry, on the same basis as that of the Army and Navy Ministries. This definite reorganisation of the Air Ministry now forms part of the general reconstruction of the Military Ministries.

Army, Navy and Aeronautics, up to June, 1925, claimed the most important parts of the funds which the country could afford for the National Defence. In order to stop useless controversy, Mussolini thought it best to assume the control of the three Ministries (Army, Navy and Air) by becoming Secretary for each, and this practically succeeded in creating

many different experimental machines were made in order to improve the construction of the engines, etc.

The third period, which ended on October 31, 1925, showed the result of an increase in the number of squadrons up to 90 and the bureaucratic organisation of the Air Ministry on the same basis as that of the Army and Navy Ministries.

In June, 1925, General Alberto Bonzani was nominated Assistant Secretary of the Air Ministry, and General P. R. Piccio, the Italian Ace, was appointed Chief of the Air Staff.

The problem of the Air Ministry, like that of the Navy, is

essentially one of staff and material. In the Italian Air Force men enlist and are instructed in the following ways :

Pilots : These are Officers and Petty Officers who come from the Air Academy or by direct admission with the grade of Lieutenant or by enlisting with the grade of Petty Officer.

Engineers : The aeronautical engineers, who form the Corps of Air Engineers, are recruited from the Civil Service

Whilst the meteorological section is, in England, attached to the Air Ministry, in Italy it is, instead, independent of the Air Force.

There are but slight differences as regards material :— Italian pursuit 'planes have, it is claimed, a higher speed and attain greater altitudes, but have a less efficient armament than the British machines.

The Italian night bombing 'planes must attain a height of

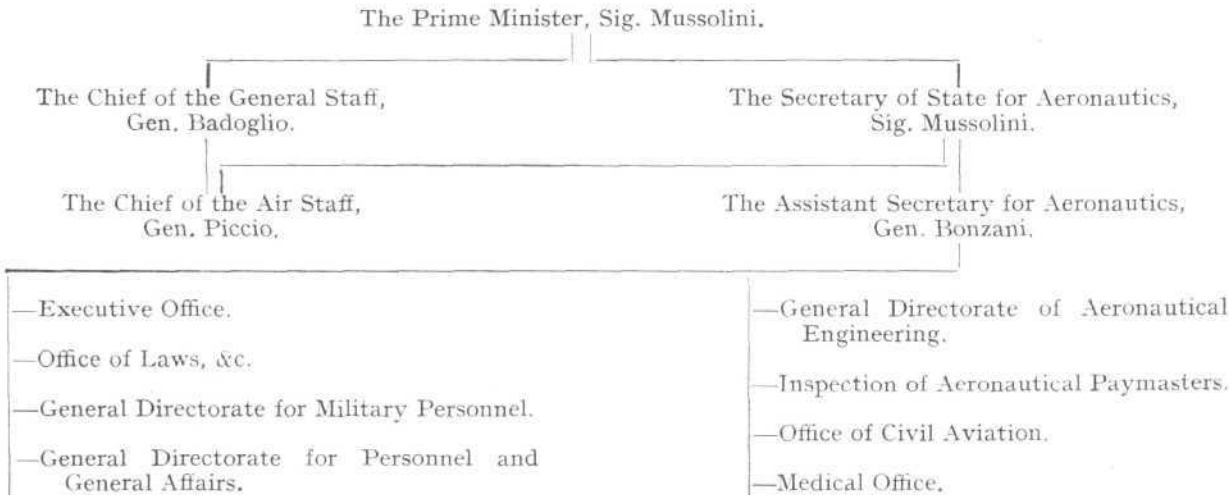


Fig. 2.

Schools of Engineering and take a special course of instruction. They must also qualify for a pilot licence.

Technical Men : These are taken from the Military Schools, and the men who pass the necessary qualifications reach the grade of Petty Officer. The best are made Officers (non-commissioned) and can reach the grade of Captain.

Material : Machines and engines are built exclusively by the civil firms, who also carry out the experimental work. The Government has only one establishment—that for the construction of airships and kite balloons.

It may, perhaps, be of interest to note the differences between the Italian and the British Air Ministries. The Italian Ministry differs mainly in the following :

Technical questions regarding the Staff are handled by the Air Engineers Corps, which does not exist in the British Air Force. On the other hand the medical service is carried out by Army and Navy Surgeons, whereas our own Air Force has its own medical service.

12,000 ft., which allows the weight of the machine to be kept comparatively low, whilst the day-bombers are called upon to show a slightly higher speed than that required of the British day-bombers.

On the other hand Italy does not possess a two-seater fighter, and employs for observation purposes a type of 'plane similar to the D.H. 9A.

The Italian Air Force has in service some single-seater seaplanes, but has no cruiser sea-planes. Although at present Italy has no aircraft carriers, it has now been decided to equip battleships with light machines—the catapult system for the launching of seaplanes from the decks of battleships having been tested with good results.

In conclusion, while the Italian Air Ministry aims at maintaining the largest possible number of squadrons with a minimum of experimental and administrative work, our own Air Ministry devotes considerably more attention to these two latter sides.

LIGHT 'PLANE CLUB DOINGS

London Aeroplane Club

FLYING has been very restricted during the week. Saturday was the first time the weather was at all possible, and we managed to get in just over six hours' flying. On Sunday it rained all the morning, and cleared up a little in the afternoon to allow about one hour's instruction.

The following members had flying instruction :—Col. Turner, E. S. Brough, C. E. Murrell, E. K. Blyth, A. P. Hunt, V. H. Doree, D. Kittell, H. R. Thomas, L. E. Vincent. The following members flew solo : P. G. Lucas, Major Beaumont, Mrs. Elliott-Lynn, Squad-Leader M. E. A. Wright. The total flying for the week was 7 hours 30 minutes.

Members are reminded of the dance at the Suffolk Galleries, Suffolk Street, W.1, on Wednesday, January 13, starting at 9 p.m. Tickets, 10s. 6d., may be obtained from the Pilot Instructors, at the aerodrome, or at the offices, 3, Clifford Street, London, W.1.

The Lancashire Aero Club

The weather has been bad, flying has been possible on only Thursday, Friday and Saturday.

Mr. Cantrill gave dual instruction on L.R. to :—A. Jowett 40, A. Macnair 25, C. Parker 30, P. Michelson 20, C. Colley 10.

Tests occupied 25 minutes. Total time flown 2 hours 5 minutes. Five persons had instruction.

The Newcastle-upon-Tyne Aero Club

FLYING report for week ending Sunday, January 3, 1926 :—Total times, G-EBLX 9.01, G-EBLY 2.32, total 11 hours 33 mins.

The following had dual instruction, under Major Packman :—Messrs. H. H. Leech (2 hours 45 mins.), J. M. Campbell (17 mins.), A. Bell (15 mins.), J. D. Irving (2 hours 2 mins.), L. Smith (32 mins.), J. S. Jardine (15 mins.). Secondary dual, Mr. R. N. Thompson (35 mins.). Solo, Mr. R. N. Thompson, 1 hour 50 mins. "A" pilots, Mr. W. Baxter Ellis (15 mins.), Mr. P. Forsyth Heppell (17 mins.). Passengers : Mr. Harle (15 mins.), Mr. J. W. Holmes (15 mins.), Mr. Kerr (15 mins.), Mr. W. Walker (15 mins.), Mr. Nicholson (10 mins.), Mr. Kerr, Junior (15 mins.).

Mr. J. W. Holmes, who will be remembered as first President of the North East Coast Aero Club, visited the aerodrome on Monday, and expressed surprise on seeing the completeness of the equipment of the Club, and was very well pleased with the flight he had with Major Packman. Mr. Holmes is a member of the Yorkshire Club now.

Mr. J. M. Davidson, who has spent the past five years in America and only returned to England on Christmas Eve, visited the aerodrome on Sunday and decided right away to become a member, which he did, and had a 15 minutes'

joy ride in the rain. The members present were very much interested in the descriptions he gave of the manner in which civil aviation is carried in the United States. It was felt that he should feel quite at home in Moths, in spite of all the examinations, tests and certificates required in connection with flying in this country.

The manner in which the exhaust pipe affects the running of an engine had possibly not been fully appreciated previous to fitting a new one to L.X. Major Packman states that the engine now "runs like a Rolls Royce." This is a distinct improvement upon the "Ford-like rattle" of the old pipe in its later days. It fell off almost at the moment the delivery sheet was being signed in respect of the new one, so that extravagance cannot be charged to the staff of the club.

Carburettor trouble was experienced by Mr. Jardine (Mr. J. Bell, passenger) when proceeding to the aerodrome on Sunday morning, in his motor car. Members who observed, on returning to the city a day or two previously, two persons pushing a car in the direction of Newcastle, strongly suspect that the same car had developed similar trouble and was then being assisted by the same crew.

Mr. P. Forsyth Heppell and Mr. N. S. Todd have now received their "A" licences. (Ex-war pilots who have re-qualified.)

Some 40 members and friends attended the New Year's Eve dance at the Aerodrome and spent a very happy time.

Flying Report from Commencement to December 31, 1925

Month.	Total		Instruction		Solo Flying		Tests		Joy Rides	
	Flts.	Flying Time	Flts.	Hrs.	Flts.	Hrs.	Flts.	Hrs.	Flts.	Hrs.
		h. m.		h. m.		h. m.		h. m.		h. m.
Sept. ...	63	16 14	26	7 05	9	2 10	4	0 35	24	6 24
Oct. ...	100	42 32	53	22 21	11	3 15	4	0 20	32	16 46
Nov. ...	192	80 05	109	55 41	25	12 36	13	1 20	31	6 26
Dec. ...	136	67 20	64	43 45	22	10 21	15	1 55	19	5 09
Total...	491	206 11	252	128 52	67	28 22	36	4 10	107	34 45

Flying by "A" licensed members is shown under heading Solo for September and October. The totals for November and December are as follows :— November, 14 flights, 4 hours 2 mins. ; December, 16 flights, 6 hours 10 mins. (Included in totals in above table.)

The first machine was delivered to the Club on September 15, the second on October 7. Instructors—one. Ground engineers—one.

AERONAUTICAL RESEARCH COMMITTEE REPORTS

FROM the number of enquiries we receive it appears that there is a desire in aircraft circles to know approximately the contents of the various technical publications of the Aeronautical Research Committee. All the aircraft firms probably receive these reports regularly, whether or not they contain anything of immediate interest or utility. In the case of draughtsmen, however, and others interested in aeronautics, who can hardly be expected to purchase all the reports, the problem of deciding whether any publication interests him is often a difficult one. As it is obviously desirable that the knowledge of aeronautics should be made available to all who take an interest in the subject, we have arranged with the Air Ministry to publish in *FLIGHT* summaries of all the technical publications as soon as these are issued, or shortly before they are published. All A.R.C. publications can be purchased from H.M. Stationery Offices at Adastral House, Kingsway, London, W.C.2; 28, Abingdon Street, London, S.W.1; York Street, Manchester; 1, St. Andrew's Crescent, Cardiff; 120, George Street, Edinburgh, and through any bookseller.

The Rolling and Yawing Moments of an Aerofoil in Straight Flight. By H. Glauert, M.A. Presented by The Director of Scientific Research. R. & M. No. 980. (Ae. 193). (5 pages.) July, 1925. Price 3d. net.

A difficulty inherent in almost all present-day aeroplanes is the fact that the use of the ailerons imposes on the aeroplane a yawing moment as well as a rolling moment. This difficulty has been overcome by the slot-and-aileron control which is described in R. & M. 968 (Full-scale tests of a new slot-and-aileron lateral control. By H. L. Stevens). The present report deals with the method of calculating this yawing moment for a given amount of roll on a conventional aeroplane, using an analysis of the same type as that developed by Prandtl in his Vortex Theory of Aerofoils.

The yawing moment is due partly to the profile drag, and partly to the induced drag of the aerofoil, and calculations of the induced yawing moment for certain special cases are given in recent papers by Munk and Scheubel.

The analysis of the problem by means of Fourier series leads to a simple solution in the general case, and the relationship between the rolling moment and the induced yawing moment referred to wind axes is found in terms of the load distribution across the span of the wing.

The induced yawing moment can be reduced to some extent by the use of tapered wings whose tip chord is less than half the central chord, but the possibility of obtaining no yawing moment about the wind axes depends on some device, such as the slot-and-aileron control which introduces a profile yawing moment of the opposite sign to the induced yawing moment.

An Experimental Investigation into the Properties of Certain Framed Structures having Redundant Bracing Members. Report No. 3. By Prof. A. J. Sutton Pippard, M.B.E., D.Sc., and G. H. W. Clifford, M.Sc. R. & M. No. 977. (Ae. 191.) (12 pages and 1 diagram.) September, 1925. Part 4.—An Experimental Investigation of the Applicability of the Principle of St. Venant to a braced tubular framework. Price 6d. net.

The problem of redundancy is common to all engineering construction, but it is not known how far the redundancy affects the strength as a whole. A long research on this subject was commenced eighteen months ago, and two previous papers have been published as R. & M. Nos. 948 and 971.*

All the experiments have been carried out on a braced tubular framework, three bays in length, each bay being hexagonal, as the theoretical equations for this case had been worked out and published in another paper, R. & M. 800.†

The conditions of the present experiment were designed to accord with the Principle of St. Venant so as to determine the effect of the number and disposition of redundancies on its operation.

The experiments show that with efficient bracing in the plane of the applied load system the stresses tend quickly to become independent of the arrangement of that system, and with additional bracing elsewhere a much quicker equalization of stress is produced.

* R. and M. 948 comprises Parts 1 and 2 of the investigation. R. and M. 971 comprises Part 3.

† R. and M. 800. "Report of the Airship Stressing Panel."

ROYAL AERONAUTICAL SOCIETY

(Official Notices)



Conversazione.—Sir Samuel Hoare, Secretary of State for Air, has kindly consented to attend the Society's *Conversazione* on Tuesday, January 12, which is being held to celebrate the Society's sixtieth birthday. H.I.H. Prince Chichibu will also be present. Members and their friends will have an opportunity of inspecting the wonderful collection of exhibits in the Aeronautical Section of the Science Museum, which are

the most numerous and representative of any collection in the world. The String Band of the Royal Air Force will play during the evening and refreshments will be provided.

Lecture.—The first lecture of the second half of the Sixty-First Session is being held to-day, January 7, at 6.30 p.m. in the Library at 7, Albemarle Street, W.1, when Professor A. J. Sutton Pippard, D.Sc., F.R.Ae.S., will read a paper on "The Experimental Stress Analysis of Frameworks with Special Reference to the Problems of Airship Design."

Programme of Lectures.—Particular attention is drawn to the change of time of the Society's lectures, from 5.30 p.m. to 6.30 p.m.

The following programme has been arranged:—

Thursday, January 21, 6.30 p.m.—In the Library. Lecture, "The Schneider Cup Race, 1925," by Major J. S. Buchanan, Associate Fellow.

Thursday, February 4, 7 p.m.—Joint Meeting with Inst. Automobile Engineers at the Royal Society of Arts. Lecture, "American Aircraft Engine Development," by Mr. C. L. Lawrance.

Thursday, February 25, 6.30 p.m.—In the Library. Lecture, "Long Distance Aeroplane Flights," by Mr. A. J. Cobham.

Thursday, March 4, 6.30 p.m.—In the Library. Lecture, "The Development of Airship Mooring and Handling," by Major G. H. Scott, G.B.E., A.F.C., Associate Fellow.

Thursday, March 18, 6.30 p.m.—In the Library. Lecture, "Handling Aeroplanes in Fog," by Flight-Lieut. H. Gooch.

Thursday, April 15, 6.30 p.m.—In the Library. Lecture, "The Tailless Aeroplane," by Capt. G. T. R. Hill, Associate Fellow.

Thursday, April 29, 6.30 p.m.—In the Library. Lecture, "The Results of Recent Airship Flight Tests," by Lieut.Col. V. C. Richmond, O.B.E., Associate Fellow.

Students' Section.—

Thursday, January 28, 6.30 p.m.—In the Library. Informal Discussion on "Air Travel." Mr. Handley Page, Fellow, in the Chair.

Saturday, February 6.—Visit to Croydon Aerodrome. Meet at Trust House Hotel Entrance at 3.0 p.m. sharp. Captain H. R. Gillman, Associate Fellow, will conduct the party round.

Thursday, February 18, 6.0 p.m.—In the Library. Lecture and Discussion, "Bernoulli and Aerodynamics," Mr. M. S. Hooper.

Saturday, February 27.—Visit to the de Havilland Aircraft Company's Works at Stag Lane Aerodrome.

Thursday, March 11, 6.0 p.m.—In the Library. "Experimental Flying from the Pilot's Point of View," by F/O. R. L. Ragg.

Thursday, March 25, 6.0 p.m.—In the Library. Lecture and Discussion "Stalled Flying" by Mr. S. S. Hall.

Thursday, April 8, 6.0 p.m.—In the Library. Lecture (to be announced later).

Further visits to be arranged for May and June.

Will those Students who wish to take part in any visit kindly let the Secretary know as early as possible, so that the necessary arrangements can be made.

J. LAURENCE PRITCHARD, *Honorary Secretary.*

THE WRIGHT-BELLANCA SIX-SEATER

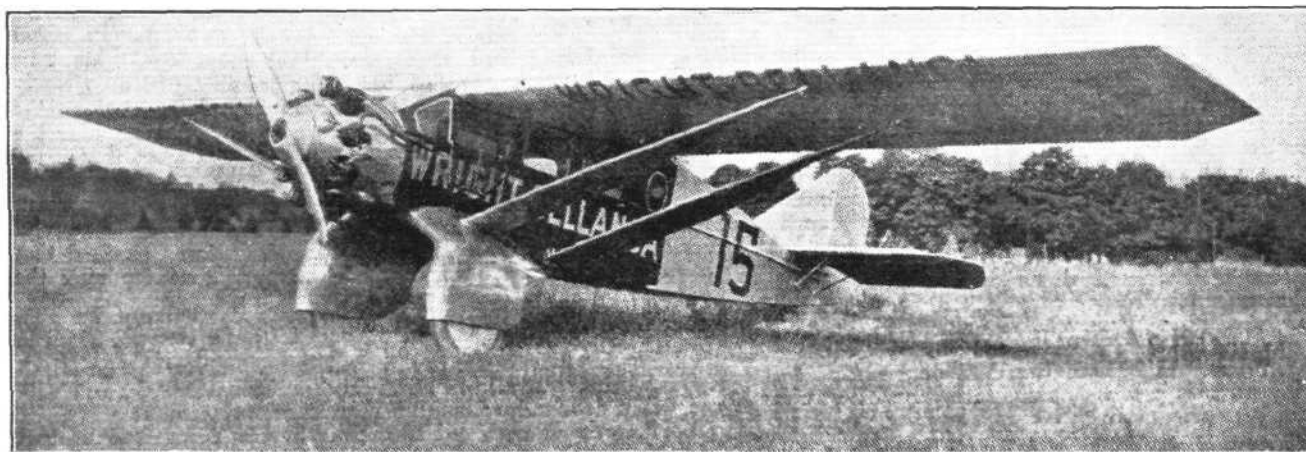
An American Commercial Cabin Machine

AN American commercial aeroplane that gave rise to a certain amount of interest on the occasion of the last New York Air Meet, held in October, during which it obtained first place in the efficiency test in Event No. 5 (Aviation Town and Country Club of Detroit Trophy Race) was the Wright-Bellanca—a six-seater, built around the 200 h.p. Wright "Whirlwind" engine.

The importance of speed in commercial work is one of the primary factors in the practical utilisation of the aeroplane

It will be remembered that the latter, also an air-cooled job, put up some noteworthy records and established for itself an excellent reputation. The new model, however, besides having a more powerful engine and some 5-ft. more wing span, possesses many important improvements and refinements.

The Wright-Bellanca is a tractor cabin-fuselage monoplane, with fairly thick-section wings mounted on the top of the fuselage, and braced by struts. There are two struts for the entire external bracing of the wing on either side, and a



THE WRIGHT-BELLANCA SIX-SEATER: An American commercial aeroplane fitted with a 200 h.p. Wright "Whirlwind" engine. The wing-struts also contribute to the lift.

over other methods of transport. It is interesting to note, therefore, that the Wright-Bellanca attained an average speed over the two-mile course at Mitchel Field, with pilot and five passengers, of 138 m.p.h.—considerably higher than the performance expected by the designer himself.

This new machine was designed by Mr. G. M. Bellanca, who has been responsible for several other successful designs—a low-powered biplane built in 1918 and a cabin-type monoplane (or, to be exact, a sesquiplan) on similar lines to the machine under review built in 1922, and which was described in *FLIGHT* for September 28, 1922.

Mr. Bellanca severed his connection with the original Bellanca firm some years ago, and the new Wright-Bellanca is being produced by the Wright Aeronautical Corp. of Paterson, N.J., who announced a short while back, that they could put this machine, including engine, on the market for about \$12,000, and that orders were then being booked for delivery next spring. This is an indication that the machine has got beyond the experimental stage, and is, in fact, an advanced and improved version of the model produced in 1922.

somewhat unique feature of these struts—which extend from the lower longerons of the fuselage up to the wings at a point about one-third the total wing-span, from the tips—is that they also form lifting surfaces. It would seem that this form of wing bracing has given entire satisfaction in practice, and is likely to come into more general use when the wings are not of the true cantilever form.

In designing this machine very careful provision for safety features was made, including low landing speed, good vision, the elimination of fire hazard, good gliding angle ($12\frac{1}{2}$ to 1), excellent controllability at low speeds, wide wheel track, high wing clearance, and high safety factors throughout.

The cabin is exceptionally roomy and is of the totally-enclosed type, the pilot being located high up right in front, immediately forward of the leading edge of the wings, where he has a remarkably good range of vision in all directions—except, perhaps, directly to the rear. Large windows are provided in the main part of the cabin, access to which is obtained by means of a door in the side.

The landing gear is well designed, and is of the "Oxford-



THE WRIGHT-BELLANCA SIX-SEATER: Side view showing the wing bracing struts, which also form lifting surface, and the "Oxford Bags" landing chassis.

Bags" variety (viewed from the front there is a decided bandiness); as well as having a comparatively wide track, this landing gear is also very strong.

The Wright "Whirlwind" engine is installed in a steel engine mount hinged to the nose of the fuselage so that it can readily be swung to one side, allowing for inspection or adjustments at the rear of the engine. This engine mount is made from welded steel and tube chrome molybdenum steel, and weighs only 13½ lb. The oil tank is located in this mount.

From a profit-making standpoint, the Wright-Bellanca would appear to offer great possibilities, seating five passengers with light luggage, or six passengers without luggage. For express and mail carrying the large cabin space (122 cub. ft.) provides a great amount of cargo room.

Having a quick take-off (900 ft. per min.) and short "roll," the Wright-Bellanca could be used in any locality when ordinary landing field facilities are found. Once in the air and under normal cruising conditions only a low output of power is necessary, which means a low fuel cost.

With the high speed figure of 138 m.p.h., attained at the New York air races, this machine cruises easily at 100 m.p.h.

at 1,500 r.p.m. At this rate the fuel consumption is about 12.5 gallons per hour. It was also noticed at the New York air meet demonstrations that the Bellanca could fly at low speeds with the tail well down without any danger of pancaking or stalling. This makes for a short "roll" in landing, which, together with the low landing speed of 42 m.p.h., is all in its favour as regards commercial work.

Other more important characteristics of the Wright-Bellanca are as follows:—

Span	45 ft. 0 in.
Chord	6 ft. 7 in.
O.A. length	24 ft. 9 in.
Height	8 ft. 5 in.
Wing area	272 sq. ft.
Weight, empty	1,790 lb.
Weight, fully laden	3,230 lb.
Weight per h.p., fully laden	16.1 lb.
Weight per sq. ft., fully laden	11.8 lb.
Pay load	850 lb.
Fuel capacity	63 gals.
Oil capacity	5½ gals.

WITH SEAPLANE AND SLEDGE IN THE ARCTIC*

THE author of this remarkable and brilliant publication, brilliant not only for the narrative of all absorbing interest, but also for the fine literary story-telling style in which it is written, is only 24 years of age, and has been responsible for organising three Oxford Expeditions in the last four years, and has also been leader of the last two detailed in this book.

Mr. Binney's volume will be found to be of invaluable interest to those interested in Polar exploration, or anyone engaged in studying any of the numerous subjects which come under this title. Explorers in general will find the Appendices of great assistance in planning or organising a party for exploration of any kind, whether it be raiding the great African jungles or endeavouring to conquer Mount Everest, his notes on the "Handling of an Expedition's Press and Film Rights," "A Form of Agreement for Enrolling Members of an Expedition," or "Salient Points of a Ship's Charter in the Arctic, Insurance, etc.," will be found to be both instructive and informative, and not of little value to those desirous of following the footsteps of the Vikings, as well as scientists.

This thrilling story of adventure reveals how, with the aid of a seaplane, two ships, and three sledging parties, the work of exploring North-East land was carried out in the face of misfortunes and adversity. Interwoven into the story there is a mass of information on all manner of subjects connected with Arctic exploration. It is stated that it has been Mr. Binney's particular aim to initiate those who are desirous of undertaking Polar exploration, and who are handicapped by lack of experience, into the ways and means of fulfilling their wishes. We do not know of any book of recent years dealing with this subject in such a practical manner so thoroughly and exhaustively.

The courage, resource, and dauntless resolution which distinguished every member of the expedition, is justly paid tribute to by Professor W. J. Sollas, D.Sc., LL.D., F.R.S., in a comprehensive preface. "The purpose of the expedition was threefold," writes Prof. Sollas, "first, and most general, to test the powers of a new method of attack by observation from the air. This was successfully accomplished. The possibility of using a seaplane in arctic waters as an instrument of research was established, and, by its means, used in conjunction with observations on the land, a topographical survey of parts of North-East Land—the most northern survey of this kind ever attempted—was achieved."

The Council of the Air Ministry was not slow to recognise the value of this work, and they have formally expressed the opinion that the report of the aircraft work of the expedition is "a material contribution to the solution of the difficulties attending aerial surveys in arctic regions."

The second purpose of the expedition was directly scientific, dealing with the structure of the land, the movements of the ice, and phenomena of the atmosphere, etc. The British Isles, scientists aver, were, twenty or thirty thousand years ago, subject to all the rigours of an arctic climate, and those engaged in the study of problems of this kind will find much profitable information in the report of the Oxford expedition.

Thirdly, the purpose of the expedition was to serve as a school for explorers—though it proved to be a hard school for the members of the expedition. Nevertheless, it places at the disposal of all direct knowledge of facts which will prove of inestimable service to those engaged in the field of science. Prof. Sollas sums up the crowning success of the expedition with a notable sentence: "Peace has its victories no less than war, and this was one of them."

To Major-General Sir Sefton Brancker the expedition tenders its thanks for his support, but we cannot do better than quote the reference to the conservative attitude of the Air Ministry itself, the last sentence illustrating the true sportsmanship of the Leader.

"The Air Ministry itself gave little support—and that charily, in spite of the recommendation of two ex-Air Ministers. They were not prepared to lend either a pilot or instruments for experimental work. Finally, they were induced to loan certain instruments and to construct an aerial camera, but at so late a stage that the camera could undergo no tests prior to our departure. In return for this loan we were to carry out certain experiments and to furnish a report; but, lest the seaplane should crash in the course of these experiments and the instruments be lost, we were required to furnish a bond of £300, which is another way of saying 'Heads we win, tails you lose.' 'But, when all is said and done,' remarks Mr. Binney, 'why should they adopt any other attitude?'"

Messrs. A. V. Roe and Co., Ltd., built the seaplane and supplied all its equipment and spare parts at less than cost price (£1,200). Messrs. Armstrong-Siddeley loaned the expedition one of their new 180-h.p. Lynx air-cooled engines for the seaplane. The Radio Communication Company undertook to instal the ship—the *Polar Bjorn*—with standard ship's wireless, and to lend an operator; whilst the British Petroleum Company presented the party with petrol supplies, and loaned them the services of Capt. J. C. Taylor as ground engineer for the seaplane. Sir Charles Wakefield presented the lubricating oil for ships and seaplane, while Sir John Thornycroft lent a powerful Thornycroft motor-launch for use in the ice.

It was a matter of difficulty to secure an experienced staff of airmen, but if difficult to obtain, they amply repaid, as the story of their herculean work throughout confirms. The aerial staff included Messrs. Tymms (navigator, photographer, and scientist), Taylor (ground engineer), and Ellis (pilot), the latter, the author tells us, having had over one thousand hours' flying experience on all types of seaplanes. The seaplane was a modification of the standard Avro 504K, and the fuselage had been constructed with a view to the nature of the undertaking. In place of the observer's seat a small cabin had been built, which had a sliding roof and windows on either side. The seaplane, in case of a forced landing, carried rations for two men for a month, and sledging equipment and a tent. A seven-foot sledge was built into the afterpart of the fuselage. One of the first seaplane flights resulted in a crash halfway between Liefde Bay and Green Harbour, and for an enthralling pen picture of the plight of the occupants—one of them was the author of the volume under review—we cannot do better than recommend to our readers the chapter entitled, "Not According to Plan,"

* "With Seaplane and Sledge in the Arctic." The account of the 1924 Oxford Arctic Expedition, by George Binney. Hutchinson and Co., 21s. net.

which tells of their efforts to paddle the wrecked seaplane to shore. The *Farm* (or *Fram*) eventually came to their assistance, but it was only after 14 hours of anxiety, and when all endurance was giving out, that a small Norwegian motor-boat came to their rescue and towed the explorers to land.

The book is replete with thrills of great adventure in the frozen North, coupled as we have remarked with in-

formation of inestimable value to those engaged in scientific research.

The leader of the expedition is to be congratulated that all returned home safe and sound—even the dogs—despite their perilous adventures. They saw and conquered, and what is more pleasing than the happy return of such a party, bringing with them such invaluable information? This volume contains 50 excellent illustrations.

CORRESPONDENCE

The Editor does not hold himself responsible for opinions expressed by correspondents. The names and addresses of the writers, not necessarily for publication, must in all cases accompany letters intended for insertion in these columns.

THE LIGHT PLANE CLUBS

[2109] In a recent issue of *FLIGHT*, I notice that in the account of the London Aeroplane Club Dinner Captain Sparks asked if the Secretary of that Club would draw the attention of the Aero Club and the Air Ministry to the fact that the London Aeroplane Club should have preferential treatment. Beyond stating that London is the capital of England, and that the population is greater than any other Light Aeroplane Club centre, I fail to see how Captain Sparks can justify his remarks. Such an attitude is not likely to create harmony with the other Clubs who have had, in most cases, exceptional difficulties to overcome before progress could be made. My own idea is that preference—if such a stupid state of affairs should be brought into existence—should be on the basis of results, and in that respect I think my own Club (Newcastle) could claim a good hearing. This, however, we do not desire, as our own object is to get on with our allotted task.

JOHN BELL

Newcastle-upon-Tyne,
December 28, 1925.

AIRSHIPS IN WAR

[2110] Are large rigid airships of any value in war-time?

My reply is: "No."

I have advanced this view in my recently published "Strategy and Tactics of Air Fighting" (Longmans), and Maj. F. A. de V. Robertson, in his criticism in your issue of December 10, takes exception to it.

"The sphere of the airship," he says, "is to be patrolling the ocean trade routes and their quarries will be raiders like the *Emden*, it being axiomatic that the British Navy will forbid the surface of the sea to hostile carriers so that the airships will never be subject to attack from aeroplanes unless the latter have been released from another airship."

This reasoning, which I know to be that most often advanced by the advocates of military airships, is incontrovertible. It proves conclusively the opposite to what it is intended to prove. It is, in fact, a form of pistol which, when fired, blows off the marksman's own head.

Allow me to pull the trigger. If the British Navy can forbid the surface of the sea to hostile carriers, which implies hostile warships (including submarines) it must be able to forbid it to raiders and to ensure the safety of the trade routes. If the safety of the trade routes is ensured, the only function which the airship could fulfil would be the reconnaissance of stretches of sea water.

The argument to which your critic referred may be summed up thus: The British Navy can prevent hostile ships from approaching the scenes of operations; therefore,

the British Navy requires airships to prevent hostile ships from approaching the scenes of operations. Read that through quickly three times and its force may become clear.

A variation may be played upon the same theme thus: The airship can fight provided the other man cannot hit back. That is, of course, the only satisfactory way of fighting; but the other man, like the happiness complained of by the would-be philosopher, *will keep butting in*.

If the destruction of hostile aerodromes—floating and other—within range of the scene of operations could be ensured by our land and sea forces, we could go to war in the R.33. But wait! If we can ensure the destruction of those hostile aerodromes we must have won the war already, so the R.33 can remain in its tin.

OLIVER STEWART

London.

January 2, 1926

"A" LICENCES

[2111] Will you allow me to point out that in your leader on "Control Without Occupation" in your issue of December 24 you are in error in stating that the private owner's machine "must be certified for each flight by a ground engineer, whom the pilot has to pay"? This regulation only applies to commercial aircraft "carrying passengers for hire." The airworthiness certificate for a private aircraft holds good for 12 months without any further certificate, except in the case of an accident necessitating repairs, which must be certified by a ground engineer as efficiently effected.

All that the private owner requires is an "A" licence for himself, and an airworthiness certificate for "subsequent aircraft" (i.e., not a "type airworthiness certificate") for his machine, valid for 12 months. I do not agree with Mr. Handley Page that these simple requirements constitute a "stranglehold" on private flying. The private owner is not even required to use a licensed aerodrome, but can at his own risk, use any field. All he is required to carry in his machine are his own pilot's "A" licence, certificates of registration and airworthiness of the machine, and—not "log books"—but one "journey log book." In this he need only enter details of times and places of departure and arrival of each flight, of any forced landings and of any damage sustained.

Personally I have always considered these regulations eminently reasonable, and the minimum necessary for safety. The criticisms voiced at the Royal Aero Club dinner you reported were in almost every case made by persons who obviously were not acquainted with the regulations, but confused those affecting commercial and private aircraft respectively.

W. LOCKWOOD MARSH, *Lieut.-Col.*

ADVISORY COMMITTEE REPORT ON ATMOSPHERIC POLLUTION

THE Eleventh Annual Report of the Committee for the Investigation of Atmospheric Pollution, has just been issued. The contents are divided into four sections:—Section 1 deals with the deposit of impurity at 48 different stations. Tables are given showing the stations with the highest and lowest deposits for the year ending March 31, 1925, compared with a general average for the same stations for the previous five years. The rainfall was higher than the average in most stations, while the deposit of tar was lower. There was little difference in the deposit of sooty matter, but the total impurity was somewhat less than the average in most stations.

Section 2 deals with the automatic recorder for suspended

impurity and some very interesting results are given for Blackburn and Stoke-on-Trent. The effect of wind in governing the concentration of impurity is also dealt with at some length.

Section 3 describes dust counter observations made in different countries. There are also observations on settlement during smoke fogs, and a new explanation is given of the causation of the "London Particular."

In Section 4 the special researches undertaken by the Committee are described.

Copies of the publication are obtainable from all branches of H.M. Stationery Office, or through any bookseller, price 5s. 6d., postage 1½d. extra.

THE ROYAL AIR FORCE

London Gazette, January 1, 1926

General Duties Branch

The following are granted permanent commissions in the ranks stated (January 1):—*Flight Lieutenants*.—G. C. Bladon, D. H. Carey, F. Carpenter, C. Hallawell, C. G. Halliday, F. H. D. Henwood, D.F.C., E. J. Kingston-McCloughry, D.S.O., D.F.C., V. S. Parker, N. M. S. Russell, S. P. Simpson. *Flying Officers*.—J. N. Boothman, B. E. Embry, A.F.C., C. H. Flinn, A. D. H. Foster, C. B. Greet, P. J. R. King, A. H. Love, J. S. Phillips, A. E. Røgenhagen, H. S. Sandiford, A. T. K. Shipwright, D.F.C., G. H. Smith, E. S. C. Vaughan, M.C., R. C. Wansbrough, M. V. Ward.

Flying Officer R. A. P. Roberts is placed on half-pay Scale B (Dec. 23, 1925). The following *Flying Officers* are transferred to the Reserve, Class A (Dec. 29, 1925):—E. Marler, H. J. Wykes.

Stores Branch

Flying Officer C. W. H. Moller is confirmed in his appointment in the Stores Branch (Nov. 25, 1925.)

Accountant Branch

Pilot Officer on probation J. R. Thomas is confirmed in rank and is promoted to the rank of *Flying Officer*, with effect from Dec. 3, 1925, and with seny. Nov. 10, 1925.

Reserve of Air Force Officers

H. Wyllie, O.B.E., is granted a commn. in Class C., General Duties Branch, as a *Flying Officer* (Dec. 29, 1925); *Pilot Officer* L. F. Cubitt is confirmed in rank (Dec. 23, 1925); *Flight-Lieut.* S. H. Gaskell is transferred from Class A to Class C (May 30, 1925); The commn. of *Pilot Officer* on probation, W. B. O'R. Coleman is terminated on cessation of duty (Dec. 8, 1925.)

Memorandum

G. S. Marshall, O.B.E., is granted a temp. commn. as a *Flight-Lieut.* (Legal Officer). (Dec. 14, 1925.)

London Gazette, December 20, 1925

Group Capt. P. F. M. Fellowes, D.S.O., is appointed Air Aide-de-Camp to His Majesty the King (Dec. 17) (vice the late *Group Capt.* C. F. Kilner, D.S.O.)

ROYAL AIR FORCE INTELLIGENCE

Appointments.—The following appointments in the Royal Air Force are notified:—

General Duties Branch

Wing Commander W. C. Hicks, A.F.C., to No. 2 Wing H.Q., India, to Command; 3.11.25.

Wing Commanders: J. C. Halahan, C.B.E., A.F.C., to R.A.F. Depot, pending disposal on transfer to Home Estab.; 30.10.25. I. G. V. Fowler, A.F.C., to R.A.F. Depot, pending disposal on transfer to Home Estab.; 4.11.25.

Squadron-Leader R. H. M. S. Saundby, M.C., A.F.C., to No. 4 Flying Training School, Egypt; 9.12.25.

Flight-Lieutenants: J. R. Cassidy, to H.Q., Palestine; 11.12.25. R. Whitaker, M.B.E., to H.Q., Inland Area; 10.1.26. L. H. Browning, M.C., D.F.C., to No. 3 Sqn., Upavon; 4.1.26. E. L. Ardley, to R.A.F. Depot, on transfer to Home Estab.; 30.10.25. W. Catchpole, A.F.C., to R.A.F. Depot, on transfer to Home Estab.; 4.11.25.

Flying Officers: T. H. Moon, to Engine Repair Depot, Egypt; 28.11.25. E. B. Addison, to R.A.F. Depot; 1.1.26. B. E. Embry, to No. 30 Sqn., Iraq; 1.12.25. F. W. Long, to Experimental Section R.A.E., S. Farnborough; 16.1.26. (Hon. *Flight-Lieut.*) E. V. Major and F. E. Watts, to R.A.F. Base, Calshot; 19.1.26. T. B. Fenwick, to Central Flying School, Upavon; 4.1.26. (Hon. *Flight-Lieut.*) I. E. Brodie, to R.A.F. Training Base, Leuchars; 4.1.26. J. R. Brown, D.F.C., to No. 70 Sqn., Iraq, instead of to H.Q., Iraq, as previously notified; 18.11.25. F. W. L. C. Beaumont, to No. 45 Sqn., Iraq; 12.12.25. F. L. Kingham, to No. 1 Stores Depot, Kidbrooke; 3.1.26. G. V. Wheatley and C. Gardner, to R.A.F. Depot, on transfer to Home Estab.; 30.10.25. J. T. Hall, to No. 24 Sqn., Kenley; 8.1.26. C. C. Musselwhite, to R.A.F. Depot, on transfer to Home Estab.;

4.11.25. K. R. Thomas, to R.A.F. Depot, on transfer to Home Estab.; 30.10.25. F. G. S. Mitchell, (Hon. *Flight-Lieut.*) G. N. Carroll and J. B. Townend, to R.A.F. Depot (Non-effective Pool), on transfer to Home Estab.; 30.10.25.

Pilot Officers: J. F. Young, to R.A.F. Base, Calshot; 19.1.26. B. B. Dowling, to No. 2 Flying Training Sch., Digby; 16.1.26. C. W. Martin, to No. 23 Sqn., Henlow; 1.1.26. D. C. Shaw, to No. 43 Sqn., Henlow, instead of to R.A.F. Base, Calshot, as previously notified; 15.12.25. B. E. Moody, to No. 2 Flying Training Sch., Digby; 16.1.26. J. G. Chamberlain, to No. 23 Sqn., Henlow, instead of R.A.F. Base, Calshot, as previously notified; 15.12.25.

Stores Branch

Flying Officers: F. A. Ormerod, to No. 1 Stores Depot, Kidbrooke; 22.12.25. S. D. Dennis, to H.M.S. *Furious*; 1.1.26. W. Bourne, to Air Ministry; 11.1.26.

Accountant Branch

Flight-Lieutenant C. H. Moore, to Aircraft Depot, Egypt; 5.11.24.

Medical Branch

Wing Commanders: A. W. Iredell, to H.Q., Halton, for duty as Principal Med. Officer; 7.1.26. B. A. Payne, D.S.O., M.B., B.A., to Air Ministry for Medical Staff duties; 7.1.26.

Squadron-Leader H. A. Hewat, M.B., D.T.M. & H., to H.Q., Egypt; 7.12.25. *Flight-Lieutenant (Dental)* H. J. Higgins, to H.Q., Palestine; 17.12.25.

Flying Officers: W. A. Beck, M.B., D.P.H., to Palestine General Hospital; 30.11.25. H. M. Levy, to No. 5 Flying Training School, Sealand; 29.12.25.

NEW YEAR HONOURS

It is announced in a Supplement to the *London Gazette* that H.M. the King has signified his intention of conferring the following New Year Honours:—

Order of the Bath

K.C.B. (Military Division)

Air Vice-Marshal Sir WILLIAM GEOFFREY HANSON SALMOND, K.C.M.G., C.B., D.S.O., p.s.c., Royal Air Force.

Sir Geoffrey Salmond was born in 1878, passed through the Royal Military Academy at Woolwich, and joined the Royal Artillery in 1898. He served with distinction in the South African War and in China in 1900. In the Great War he first commanded No. 1 Squadron of the Royal Flying Corps, and subsequently the 5th Wing. He served with the Royal Air Force in the Middle East from 1916 to 1921. During this period he was created K.C.M.G. and C.B.; the D.S.O. was conferred upon him, he was mentioned in despatches and granted foreign Orders. Since 1922 he has been Director-General of Supply and Research at the Air Ministry.

Promotions and Awards

The King has approved the promotion of *Wing Commander* Richard Charles Montagu Pink, C.B.E., to the rank of *Group Captain* in the Royal Air Force in recognition of his distinguished services in the field in Waziristan. To date Jan. 1, 1926.

The King has approved of the following awards to the undermentioned officers and airmen of the Royal Air Force:—

Air Force Cross.—*Squadron Leader* Arthur Coningham, D.S.O., M.C., D.F.C.; *Flight Lieut.* Leonard Graeme Maxton; *Flying Officer* Basil Edward Embry.

Air Force Medal.—327067 Leading Aircraftsman (Acting Corporal) Frank Stone; 11838 Corporal (Acting Sergeant) Henry Grant; 87366 Sergeant (Pilot) Thomas William James Nash.

The undermentioned are promoted, with effect from Jan. 1, 1926:—

General Duties Branch

Wing Commander to be Group Captain.—Edmund Digby Maxwell Robertson, D.F.C.

Squadron Leaders to be Wing Commanders.—Frederick Henry Unwin, O.B.E.; Vivian Gaskell-Blackburn, D.S.C., A.F.C.; Henry John Francis Hunter, M.C.; Arthur Clinton Maund, C.B.E., D.S.O.; Douglas Harries, A.F.C.; Arthur Claud Wright, A.F.C.; John Oliver Archer, C.B.E.; Charles William Nutting, O.B.E., D.S.C.; Robert Leckie, D.S.O., D.S.C., D.F.C.; Walter Gerald Paul Young, O.B.E.

Flight Lieutenants to be Squadron Leaders.—Henry Cockerell, O.B.E.; Francis William Trott, O.B.E., M.C.; Alan Fitzroy Somerset-Leeke; Frederick George Sherriff, M.C.; John Farquhar Gordon, D.F.C.; Charles

Beauvoir Dalison, A.F.C.; Richard Spencer Lucy, A.F.C.; William Samuel Caster, M.C.; Wilfred Henry Dunn, D.S.C.; Charles Langston Scott, D.S.C.; Hugh Henry MacLeod Fraser; Dirk Cloete, M.C., A.F.C.; Albert Durston, A.F.C.; Meredith Thomas, D.F.C., A.F.C.; Trevor Edward Salt, A.F.C.

Flying Officers to be Flight Lieutenants.—John Christian Barraclough; George Henry Russell, D.F.C.; Horace Gramshaw Payne Ovenden; Thomas Humble; Hilton Oscar Brown, M.M.; George Robert Oliver; Gilbert Latham Ormerod; Richard Vaughan Bramwell-Davis (Lieut., R.F.A.); Denis Holcombe Carey; John Duncan; Christopher Neil Hope Bilney; William Whitefield McConnachie; Charles Dudley Palmer; Alfred Edwin Lindon, M.B.E.; Albert James Ernest Broomfield, D.F.C.; Thomas Rose, D.F.C.; Charles Leslie Cox; Pat Murgatroyd; Ernest Caizley Usher; Vincent Percy Feather; Eyare King Blenkinsop; Charlton Hallawell; Robert John Hayne Holland; Robert Lyle McKindrick Barbour, D.F.C.; Lawrence Fleming Pendred, D.F.C.; Charles John Sims, D.F.C.; John Lawrence Kirby; Frederick Frank Garraway; Owen Wilson Clapp; Campbell Alexander Hoy, M.C.; Sidney Herbert Ware; Frank George Gibbons, D.F.C.; Cecil Arthur Bouchier, D.F.C.; Harold John Saker; Reginald Morville Davy; Frank George Brockman; Ernest Henry Attwood; William James Millen; Edmund Henry Searle; Eric Brewerton, D.F.C.

Stores Branch

Flight Lieutenants to be Squadron Leaders.—Nevill Ross Fuller; Walter Langston Shaw, M.B.E.

Flying Officers to be Flight Lieutenants.—George Thomas Stroud, M.B.E.; Ernest William Lawrence; John Clifford Shakeshaft; Frank Edwin Shersby; Robert Craig; Reginald Vivian Robinson, O.B.E. (Supplementary List).

Accountant Branch

Squadron Leader to be Wing Commander.—Herbert George Jones.

Flying Officers to be Flight Lieutenants.—James Frederick Robert Eales-White; Herbert Charles Frederick Ellis.

Medical Branch

Squadron Leader to be Wing Commander.—Frank Cuningham Cowtan.

Flight Lieutenants to be Honorary Squadron Leaders.—George Stephen Ware, M.B.; Edmond Francis Neville Currey; Charles Anderson Meaden; Frederick Ernest Wilson.

Princess Mary's R.A.F. Nursing Service

Sister to be Acting Senior Sister.—Miss Janet MacLeod, A.R.R.C.

Acting Sisters to be Sisters.—Mrs. Louisa Learmouth Mackenzie; Miss Mary Anne MacVicar; Miss Elizabeth Spensley, A.R.R.C.; Miss Ellen Kate Griffin.

Staff Nurses to be Sisters.—Miss Elizabeth Ann Risdon; Miss Gertrude Swanton; Miss Jessie Warnock Walker.

Staff Nurses to be Acting Sisters.—Miss Alice Mary Hardwicke; Miss Pauline Kipping Pearce; Miss Ellen Jane Stuart; Miss Mary McCallum.

THE ROYAL AIR FORCE MEMORIAL FUND.

THE usual meeting of the Grants Sub-Committee of the above Fund was held at Iddesleigh House, on December 21.

Lieut.-Commander H. E. Perrin was in the chair, and the other members of the Committee present were:—

Mrs. L. M. K. Pratt-Barlow, O.B.E., and Squadron Leader E. B. Beauman.

The Committee considered in all 18 cases, and made grants to the amount of £78 10s.

The next meeting was fixed for today, January 7.

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Air A.D.C. to The King

THE Air Ministry announces the appointment of Group Captain Peregrine Forbes Morant Fellowes, D.S.O., as Air Aide-de-Camp to the King (vice the late Group Captain Cecil Francis Kilner, D.S.O.)

London-Cape Town Survey Flight

WRITING from Khartoum, Alan J. Cobham, who is making steady progress in the London-Cape Town survey flight in a D.H.50J (Siddley "Jaguar"), sends us the following notes: "The practical side of aviation from Cairo to Khartoum is ideal and even in summer time a service could be maintained, for one can fly any time 365 days of the year day and night. . . . The Wadi Halfa-Aswan air link by seaplane, following the Nile all the way, could easily be done in two hours, and the fastest boat downstream takes 24 hours, and 36 hours upstream. . . . Landed Luxor to make film—also landed at Aswan and took fine film of Dam from air and ground also. . . . The idea is to make a propaganda film for British aviation, so must have topical stuff. . . . Up to present we have not found it necessary to fly early morning only, due to heat. True, we are in winter weather now, but the D.H.50 and 'Jaguar' combination works well for performance. . . . Both are standing up well. Machine up to present simply jumps off the ground with full load. . . . Staying at Khartoum over Xmas and then going on into the Sud to Malakal and Mongalla. Up to present have found ample supplies of B.P. spirit, which is doing very well now we have the 80-20 mixture. Also found ample supplies of Castrol everywhere, and oil temperature is keeping well down.—Alan J. Cobham." The 400-mile leg across the Sud swamp from Malakal to Mongalla was safely accomplished on January 2. During the stop at Malakal a special War Dance was given by the Shilluk warriors in honour of the airmen.

An Amateur Airship Club

COMMANDER F. L. BOOTHBY is once again endeavouring to form an amateur airship club, on the lines of the light aeroplane clubs. As we have remarked on previous occasions regarding this idea, such a club would offer great possibilities, not only from the sporting point of view, but as a national question. Small, safe and easily controlled airships of the "Blimp" type are no longer in the experimental stage, and have already proved themselves to be efficient and practicable. Such a club would serve, in a way, to fill the gap in British airship activity, pending the completion of the two Imperial airships (probably, 1928), resulting in the decision not to proceed with the reconditioning of R.36—R.33 having now nearly concluded its mission in life (No. 2).

R.A.F. Flying Accident

THE Air Ministry regrets to announce that as the result of the flying accident which occurred near Nefisha, Egypt, on December 23 last, No. 328867 A.C.1 Arthur Thomas Groom, the passenger of the aircraft, died of injuries on December 24, 1925.

A "Lion" at the School Boys' Exhibition

A NAPIER "Lion" aero engine is being exhibited at the School Boys' Exhibition at the Horticultural Hall. This engine, situated beneath the motherly wings of the Baby "Moth" aeroplane, is shown in action and various parts have been cut away so that the different movements of the engine can be seen working. This same engine was exhibited by the Air Ministry at Wembley, and it is interesting to record that during the six months of the British Empire Exhibition the engine ran from 9 a.m. until 10 p.m. continually every day without any attention. Looks as if that 100-hour Air Ministry type test will have to be modified!

Institution of Aeronautical Engineers

WE would remind our readers that Mr. C. Howarth is reading a paper on "Some Aspects of Full-Scale Experiments" before the Institute of Aeronautical Engineers on January 12.

SIDE-WINDS

It will be a matter of general interest to know that Mr. Brook Flowers, late of Messrs. Imperial Airways, Ltd., and formerly of Messrs. Handley Page, Ltd., who for many years has been engaged in commercial aviation, has now joined the Lep Transport and Depository, Ltd., which firm, as is generally known, are taking a very active interest in the development of commercial aviation.

WE undersand that the Beardmore W.B.XXVI biplane (Rolls-Royce "Eagle IX") supplied to Latvia, and illustrated in last week's issue of FLIGHT, was doped with Titanine T.2.S.

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PUBLICATIONS RECEIVED.

War Office: Graphical Methods of Plotting from Air Photographs, 1925. By Lt.-Col. L. N. F. I. King, O.B.E. H.M. Stationery Office, Kingsway, London, W.C.2. Price 3s. net.

Illustrated Calendar, 1926. Wm. Beardmore & Co., Ltd. Glasgow.

Deruluft—1 Million Luftkilometer. Deutsch-Russische Luftverkehrs-Gesellschaft, Sommerstrasse 4, Berlin, N.W.7.

Report on the Health of the Royal Air Force for the Year 1924. Air Publication 1184. H.M. Stationery Office, Kingsway, London, W.C.2. Price 4s. net.

Journal of the American Society of Naval Engineers. November, 1925. American Society of Naval Engineers, Navy Department, Washington, D.C., U.S.A.

Canadian Patent Office Record. November 24, 1925. Vol. LIII, No. 47. Patent and Copyright Office, Ottawa, Canada. Price 25 cents.

Illustrated Calendar, 1926. "Fairey Aircraft." The Fairey Aviation Co., Ltd., Hayes, Middlesex.

Morris Electric Runway. Herbert Morris, Ltd., Loughborough.

Rules of the Royal Aeronautical Society, December 30, 1925. The Royal Aeronautical Society, 7, Albemarle Street, London, W. 1.

The Olympian: Christmas Number, 1925. The Blackburn Aeroplane and Motor Co., Ltd., Olympia, Leeds.

Illustrated Calendar, 1926. The Blackburn Aeroplane and Motor Co., Ltd., Olympia, Leeds.

Aeronautical Information: General Questions and Statistics. By Prof. N. A. Rynin, Moscow, 1925. (In Russian.) Price, 2 roubles 25 kop.

Illustrated Calendar, 1926. The Bristol Aeroplane Co., Ltd., Filton, Bristol.

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AERONAUTICAL PATENT SPECIFICATIONS

Abbreviations: Cyl. = cylinder; i.c. = internal combustion; m. = motor.

The numbers in brackets are those under which the Specifications will be printed and abridged, etc.

APPLIED FOR IN 1924

Published January 7, 1926

19,411. L. RENAULT. Distribution of load on aeroplanes. (223,198.)

21,283. S. A. REED. Air propellers. (244,158.)

28,456. A. ROHRBACH. Steering-mechanism for flying-machines. (226,516.)

APPLIED FOR IN 1925

Published January 7, 1926

16,681. H. M. TAYLOR. Earth anchors. (238,197.)

17,035. R. ALKAN and G. LESOURD. Ring for suspending a mass to a device for dropping articles from aircraft. (236,575.)

21,707. J. E. BROYLES. Airships. (240,146.)

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